

SILICON-BASED FUEL CELL ELECTRODE STRUCTURES
AND FUEL CELL ELECTRODE STACK ASSEMBLIES

ABSTRACT OF THE DISCLOSURE

The present invention is directed to silicon electrode structures and silicon electrode assemblies associated with fuel cell systems, as well as to methods relating thereto. In one embodiment, the present invention is directed to an electrode structure adapted for use with a fuel cell system such as, for example, a direct methanol fuel cell system. In this embodiment, the invention may be characterized in that the electrode structure comprises a silicon substrate having one or more selectively doped regions thereon, wherein each of the one or more selectively doped regions is adapted to function as a current collector for the transmission of an electrical current. In another embodiment, the electrode structure comprises a silicon substrate having one or more discrete porous bulk matrix regions disposed across a top surface, wherein each of the one or more discrete bulk matrix porous regions is defined by a plurality pores that extend into the silicon substrate, wherein the plurality of pores defines inner pore surfaces, and wherein the inner pores surfaces have catalyst particles uniformly dispersed thereon.

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